



1966 OPERATING SUMMARY

CHATHAM

water pollution control plant

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1966
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ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

**TD
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1966**

Chatham : water pollution
control plant.

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ONTARIO WATER RESOURCES COMMISSION
OFFICE OF THE GENERAL MANAGER

Members of the Local Advisory Committee,
City of Chatham.

Gentlemen:

We are pleased to submit to you the 1966 Operating Summary for the
Chatham Water Pollution Control Plant, OWRC Project No. 62-S-102.

It is hoped that our joint participation in efforts to combat water pollution
will have even more success in the coming year.

Yours very truly,

A handwritten signature in dark ink, appearing to read "D. S. Caverly".

D. S. Caverly,
General Manager.



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ONTARIO WATER
RESOURCES COMMISSION



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801 BAY STREET
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VICE-CHAIRMAN

D. S. CAVERLY
GENERAL MANAGER

W. S. MACDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

Dear Sir:

I am happy to present you with the 1966 Operating Summary for the Chatham Water Pollution Control Plant, OWRC Project No. 62-S-102.

The report offers a concise summary of operating data for the year and comparisons with previous years where these are applicable and significant.

Yours very truly,

A handwritten signature in dark ink, appearing to read "B. C. Palmer".

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

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FOREWORD

● This operating summary contains complete information on the management of the project during 1968. It contains a concise review of the year's plant operation, significant financial details, and a visual presentation in graphs and charts of technical performance.

The information will be of value to interested parties in assessing the adequacy of the project at this time and its ability to meet future requirements.

The report is the result of co-operation by several groups within the Division of Plant Operations. These include the statistics section and the technical publications section. The Division of Finance and the draughting section of the Division of Sanitary Engineering were also closely associated with its publication.

The Regional Operations Engineer, however, has had the primary responsibility for the content, and will be happy to answer any questions regarding it.

C O N T E N T S

Foreword	1
Title Page	3
'66 Review	5
Project Costs	6
Operating Costs	7
Process Data	10
Conclusions	Inside back cover

CHATHAM
water pollution control plant

operated for

THE CITY OF CHATHAM

by the

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Operations Engineer: P. J. Osmond

801 Bay Street Toronto 5

'66 REVIEW

This report gives in detail significant data on the operation of the various treatment units at the Chatham Water Pollution Control Plant during its first year of operation.

The operating cost for the year was \$89,625.37 for a cost of \$124.99 per million gallons or 5 cents per pound of BOD removed.

The average flow treated was 1.965 MGD, which was 44% of the design capacity. During the peak month of September, the average daily flow was 3.11 MGD or 69 percent of design.

A raw sewage having an average strength of 261 ppm BOD and 216 ppm suspended solids was treated. Good percentage removals of BOD and SS were obtained. A total of 874.8 tons of BOD and 681.2 tons of SS were removed. A total of 608,740 cubic feet of raw sludge was treated in the digesters, and the digested sludge was disposed of on the plant grounds. Proper chlorination of the final effluent was maintained from May until the end of the year.

A few major mechanical and electrical breakdowns occurred, but were covered under the one-year warranty period.

PROJECT COSTS

NET CAPITAL COST (Final)	\$ 4,530,770.02
DEDUCT - Portion Financed by CMHC	<u>3,016,662.29</u>
Long Term Debt to OWRC	<u>\$ 1,514,107.73</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1966	<u>\$ 33,919.93</u>
Net Operating	\$ 89,625.37
Debt Retirement	20,438.00
Reserve	9,901.00
Interest Charged	<u>73,764.15</u>
TOTAL	<u>\$ 193,728.52</u>

RESERVE ACCOUNT

Balance at January 1, 1966	\$ 6,132.23
Deposited by Municipality	9,901.00
Interest Earned	<u>533.33</u>
	\$ 16,566.56
Less Expenditures	--
Balance at December 31, 1966	<u>\$ 16,566.56</u>

MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY	WATER
JAN	4041.00	3042.45			126.33		(8.65)	713.26	107.96	66.65	
FEB	5279.37	3072.74		530.22	932.92		139.91	157.84	323.08	122.66	
MARCH	417.24	3150.05		475.18	(1048.28)		170.91	810.55	90.53	112.08	250.22
APRIL	6697.13	4663.03		426.06	1226.69		172.53	6.93	141.14	60.75	
MAY	9939.78	3460.06		409.63	1274.09		203.57		26.13	4566.30	
JUNE	7889.67	3604.37		329.35	1192.57	1029.00	385.89	489.41	129.11	387.37	342.60
JULY	5441.9	2794.38	264.80	159.59	1382.45		288.32	19.45	57.21	459.69	
AUG	722.70	3400.52	234.80	52.27	1873.85	1029.00	112.18	939.00	101.91	213.17	
SEPT	8462.73	4932.08	170.61	66.35	2209.31		301.15	85.54	51.96	40.50	605.26
OCT	6439.63	3908.57		88.51	2052.03		237.07	202.45	442.06	(1127.48)	556.42
NOV	771.00	3616.92		235.63	1894.83	1109.85	341.68	105.06	124.49	87.14	
DEC	15664.60	3794.46		129.19	4381.29	1955.10	1052.45	3178.43	535.83	637.85	
TOTAL	9625.37	43639.93	740.21	6910.98	17498.08	5122.95	3407.01	6787.92	2131.41	5626.68	1760.50

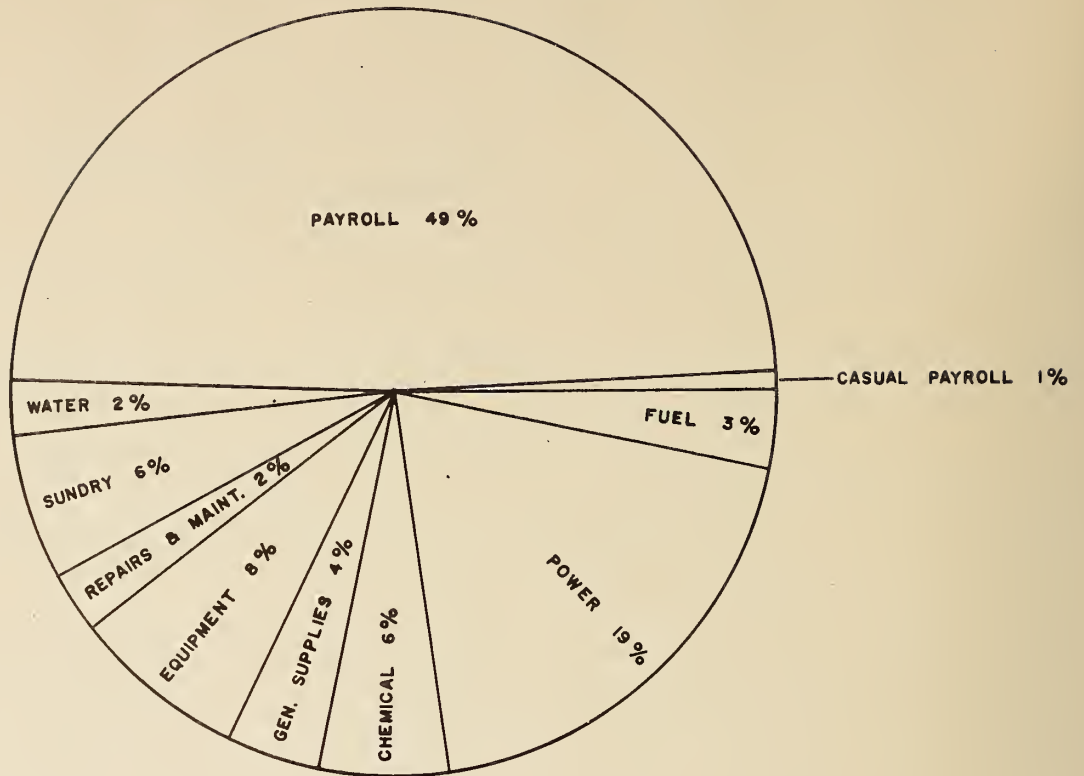
BRACKETS INDICATE CREDIT

YEARLY OPERATING COSTS

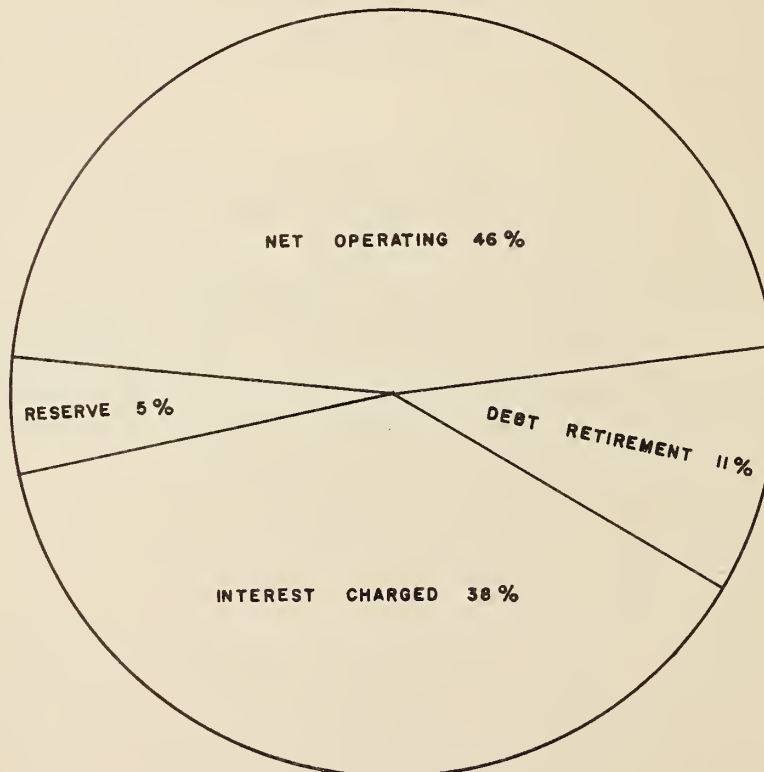
YEAR	M.G. TREATED	TOTAL COST	COST PER FAMILY PER YEAR	COST PER MILLION GALLONS	COST PER L.B. OF BOD REMOVED
1966	717.082	\$89625.37	\$11.31	\$124.99	5 CENTS

* BASED ON ANNUAL POPULATION ESTIMATE AND 3.9 PERSONS PER FAMILY

1966 OPERATING COSTS



TOTAL ANNUAL COST



Process Data

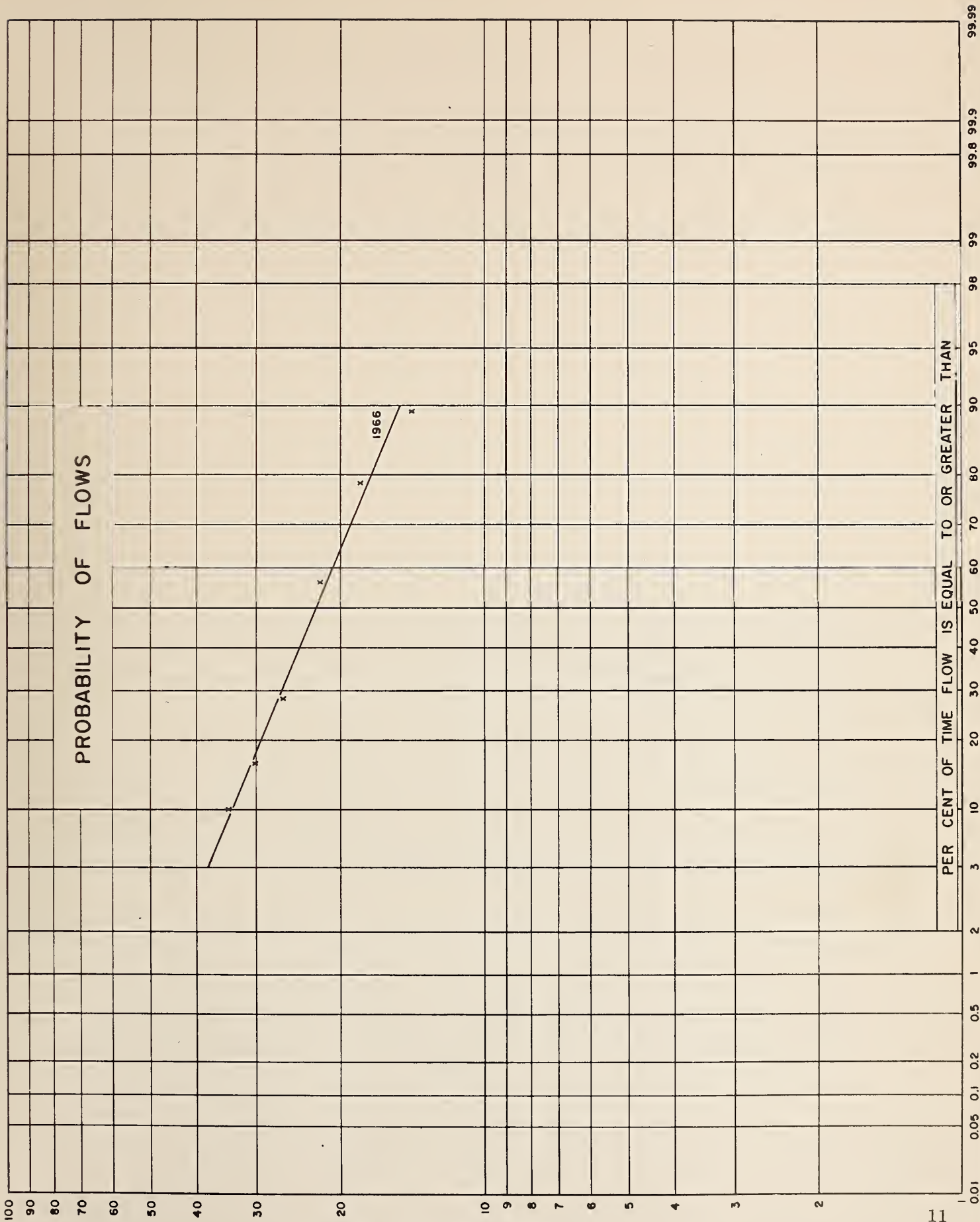
A total of 717.082 million gallons of sewage was treated at the plant in 1966, the first full year of operation. The average daily flow of 1.965 million gallons represents approximately 44% of the plant hydraulic capacity. The maximum daily flow for the year, 4.7 million gallons, occurred in November and represents 104% of plant design capacity. During the months of September and October, approximately 2.0 MG of waste from Libby's tomato pack was received at the plant.

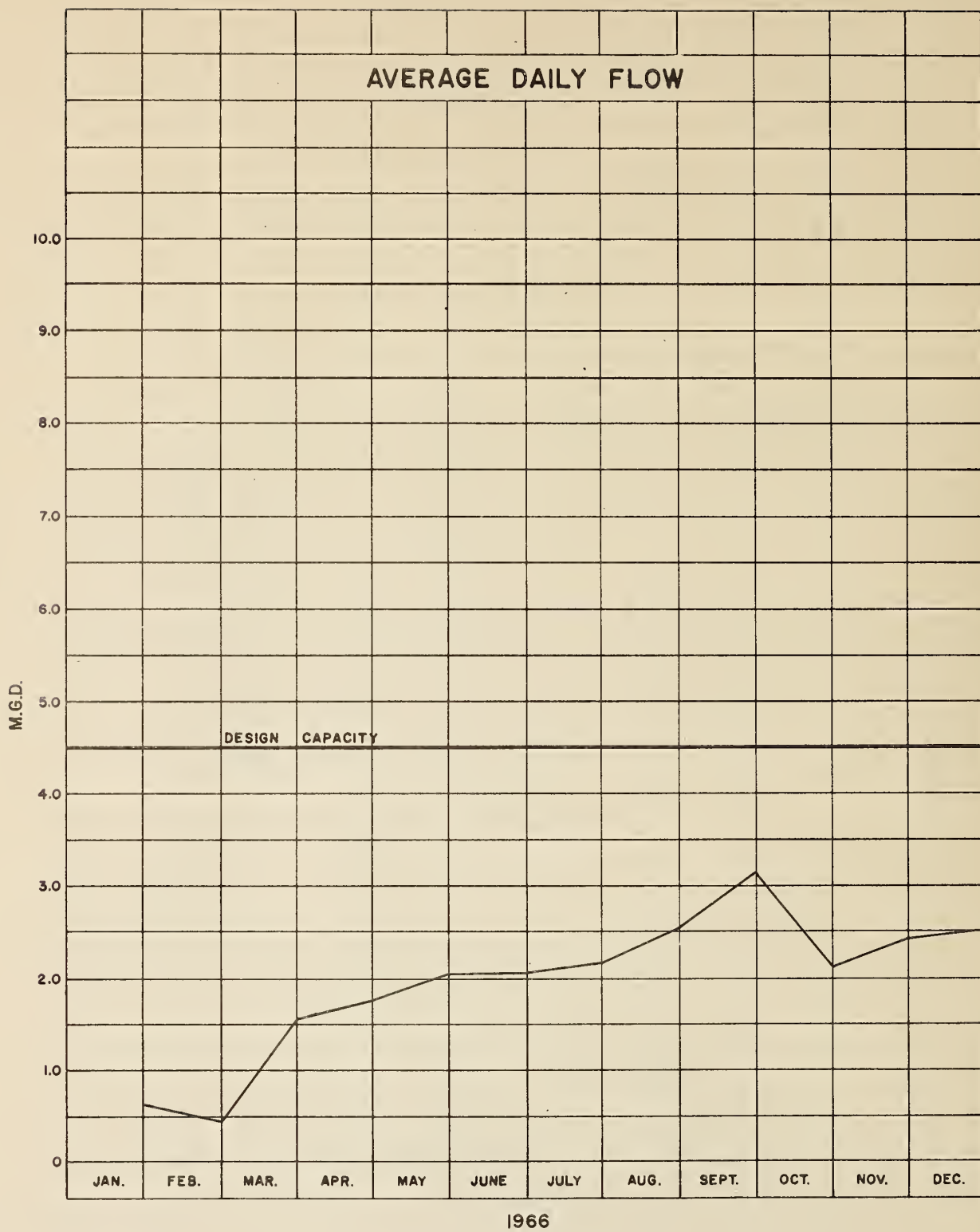
From the probability graph, it can be seen that during 1966 the design hydraulic capacity of the plant was exceeded less than one percent of the time.

AVERAGE DAILY FLOW (MGD)

PROBABILITY OF FLOWS

PER CENT OF TIME FLOW IS EQUAL TO OR GREATER THAN

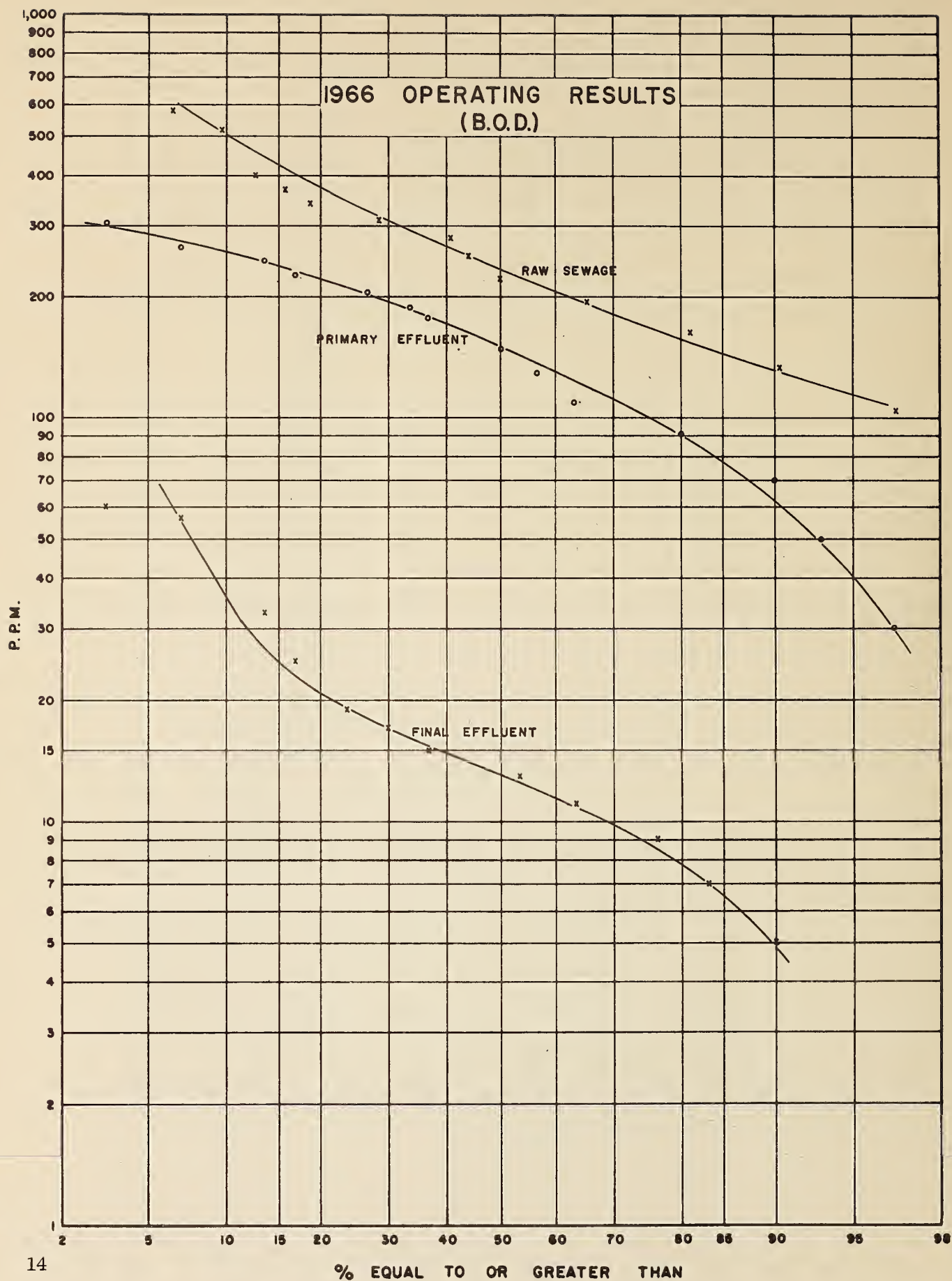


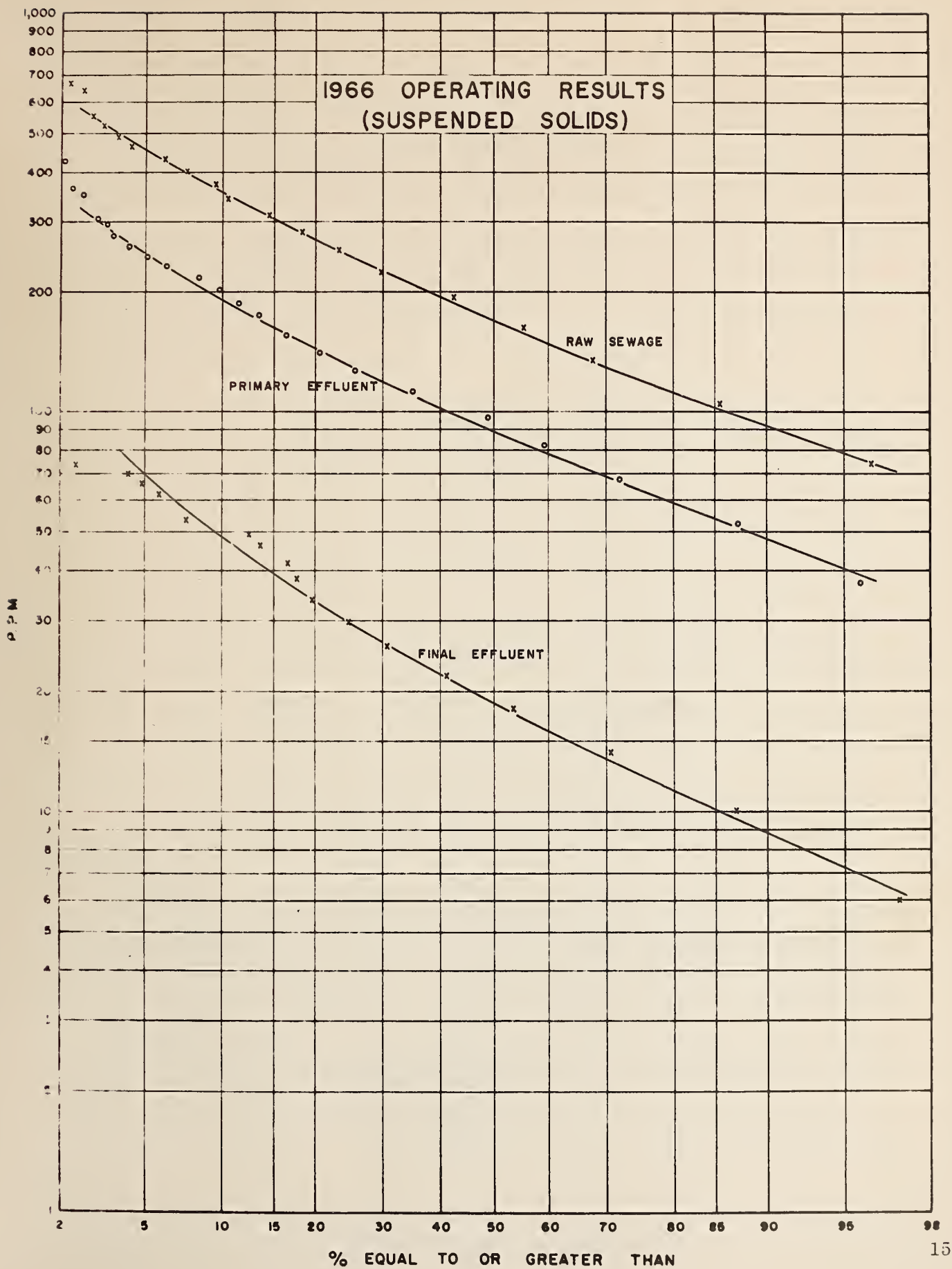


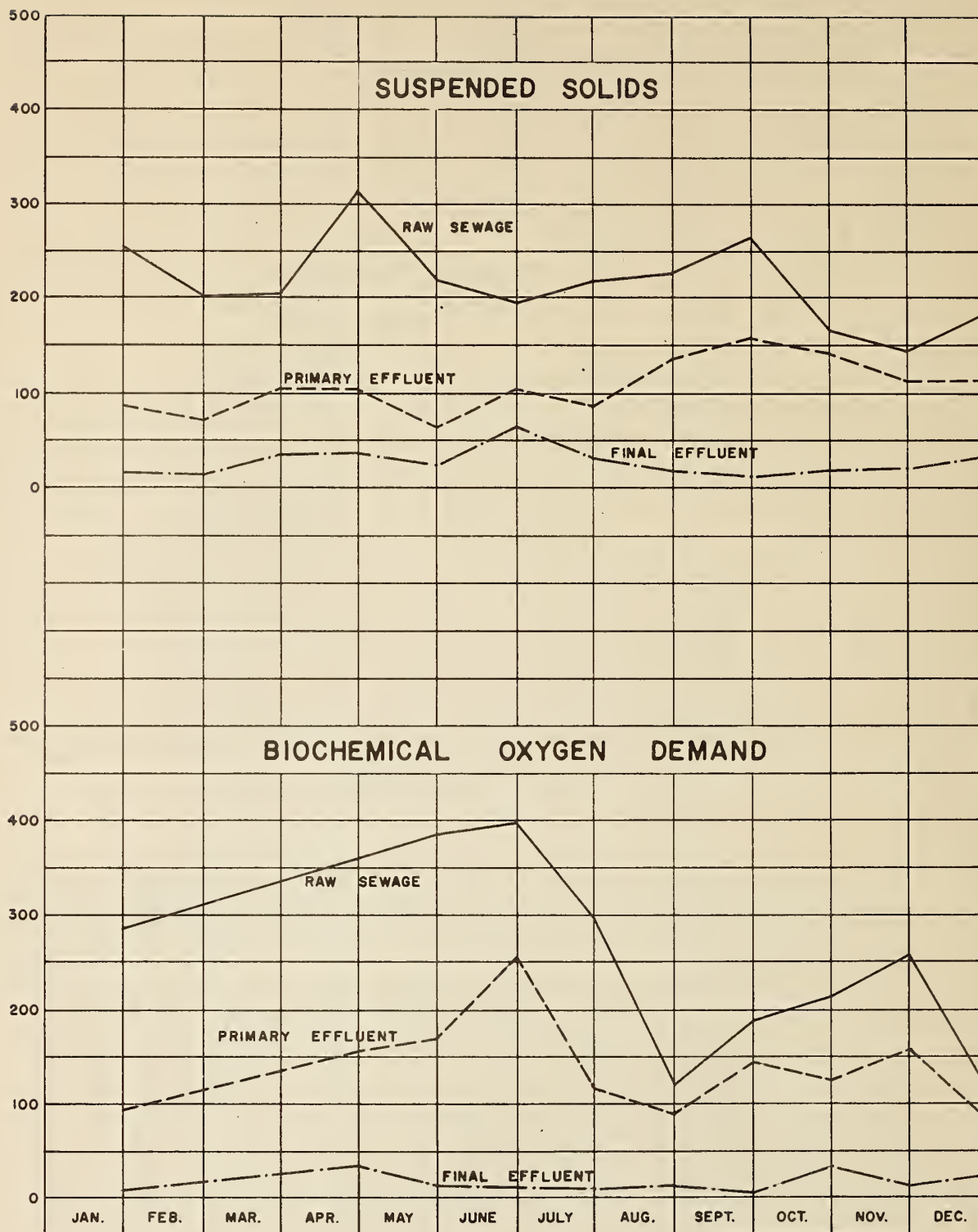
FLOW DATA

Month	Plant Flow (MG)	Avg. Daily Flow (MG)	Min. Day (MG)	Max. Day (MG)
January	19.190	0.619	0.080	1.000
February	13.079	0.467	0.019	2.040
March	49.273	1.589	0.030	4.330
April	52.930	1.764	0.790	2.700
May	63.470	2.047	1.140	3.220
June	62.820	2.094	1.400	2.800
July	67.710	2.184	1.500	3.980
August	79.840	2.575	1.710	3.800
September	93.260	3.110	1.300	3.900
October	65.520	2.110	1.400	4.200
November	72.420	2.410	1.600	4.700
December	77.570	2.500	1.600	4.070
Total	717.082	-	-	-
Average	59.757	1.965	-	-

1966 OPERATING RESULTS (B.O.D.)







GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	
JAN.	285	10	96.5	26.4	257	15	94.0	23.2	68
FEB.	* 261	17	93.5	16.0	203	11	94.5	12.6	66
MAR.	* 261	17	93.5	60.1	204	33	84.0	42.1	336
APR.	360	34	90.5	86.3	315	34	89.0	74.4	335
MAY	385	13	96.5	118.0	218	21	90.3	62.5	283
JUNE	397	* 17	95.5	119.4	196	65	67.0	41.1	260
JULY	295	10	96.5	96.5	218	30	86.0	63.6	434
AUG.	120	11	91.0	43.5	224	18	92.0	82.2	176
SEPT.	188	6	97.0	84.9	261	10	96.0	117.0	462
OCT.	214	33	84.5	52.3	166	19	89.0	48.2	214
NOV.	257	14	94.5	88.0	143	20	86.0	44.5	286
DEC.	110	23	79.0	33.7	181	31	83.0	58.2	148
TOTAL	-	-	-	874.8	-	-	-	681.2	3068
AVG.	261	17	93.5	72.9	216	26	88.0	56.8	256

* Average values substituted, no sample.

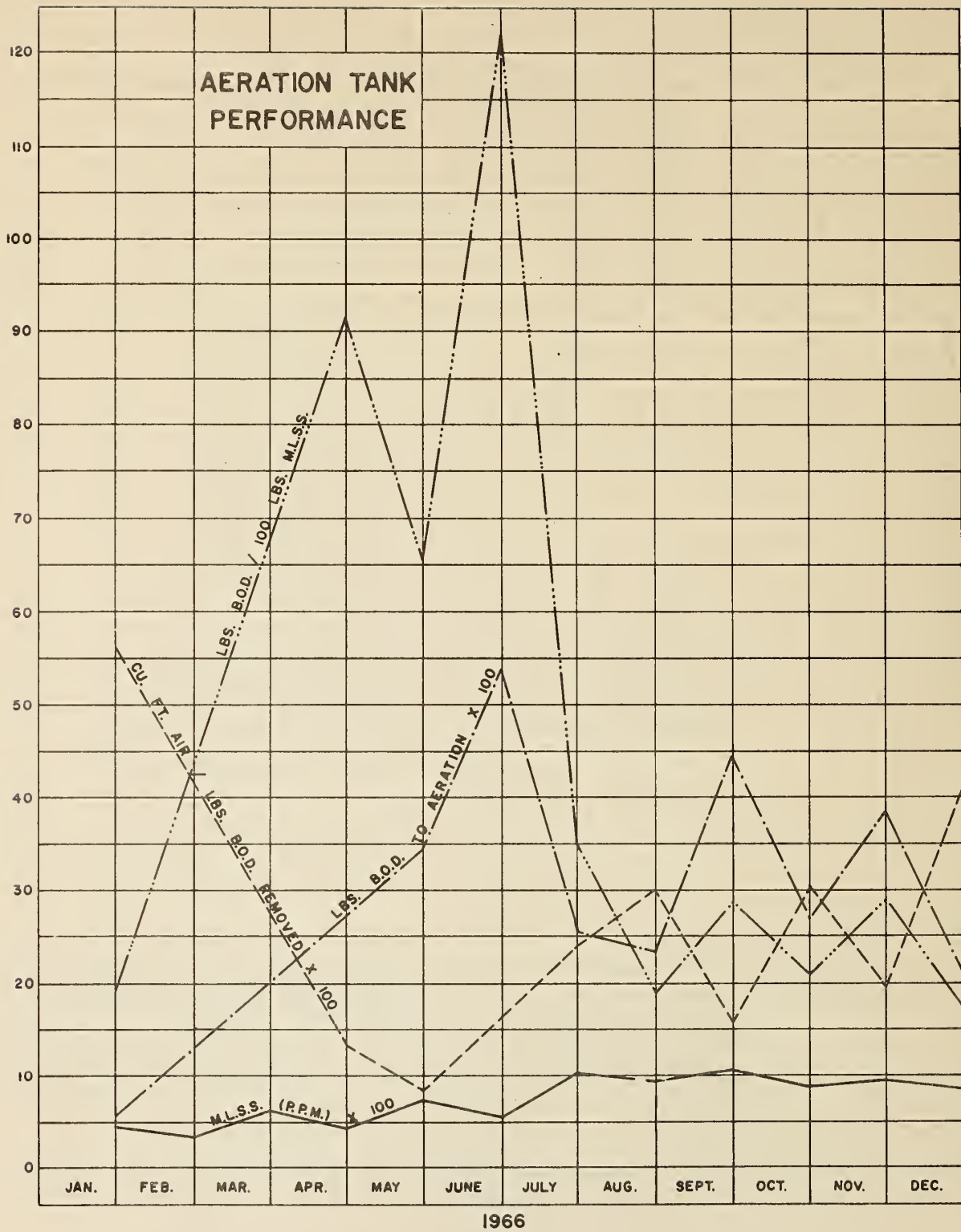
COMMENTS

The average raw sewage strengths in 1966 were 261 ppm BOD and 216 ppm SS. The average strengths of the final effluent were 17 ppm BOD and 26 ppm SS and represent removal efficiencies of 93.5 and 88.0% respectively. The final effluent met the OWRC objectives of 15 ppm for BOD 62% of the time, and for SS 36% of the time. It is hoped that this will be improved when plant loading increases and when interference from industrial wastes is eliminated. A total of 874.8 tons BOD and 681.2 tons SS was removed during the year.

The primary effluent had an average strength of 139 ppm BOD and 90 ppm SS representing removals of 46.7% and 58.3% respectively.

The above results are based on 8- and 16-hour composite samples taken at least once a week.

A total of 3,068 cu. ft. of grit was removed. This represents a grit removal of 4.3 cu. ft. per million gallons of raw sewage which is higher than average and indicates a high percentage of combined sewers in the collection system.

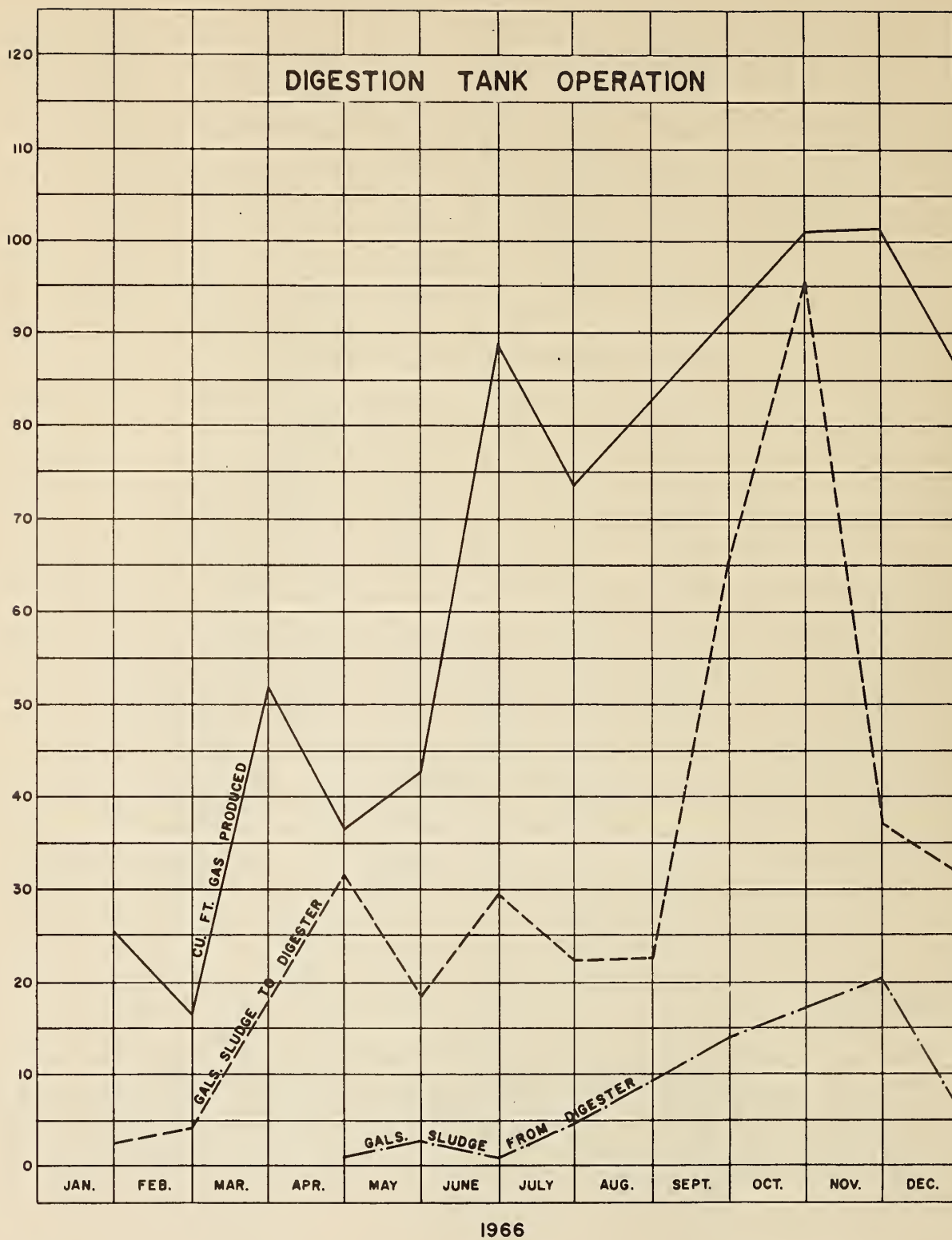


AERATION SECTION

MONTH	PRIM. EFFL B.O.D. PPM.	ML.SS. PPM.	LBS. BOD. PER 100 LBS. M. L. S. S.	CUBIC FEET AIR PER LB. BOD. REMOVED
JANUARY	95	428	19	5652
FEBRUARY	-	311	-	-
MARCH	-	621	-	-
APRIL	157	419	92	1329
MAY	170	734	66	868
JUNE	256	612	122	-
JULY	118	1002	35	2409
AUGUST	90	933	19	3006
SEPTEMBER	143	1068	29	1520
OCTOBER	126	885	21	3048
NOVEMBER	158	932	29	1913
DECEMBER	81	817	17	4162
TOTAL	-	-	-	-
AVERAGE	139	730	45	2656

COMMENTS

The average BOD to the aeration section was 139 ppm and the average MLSS was 730 ppm, resulting in an average loading of 45 pounds of BOD per 100 lbs. of MLSS. An average of 2656 cubic feet of air was supplied per pound of BOD removed. A considerable amount of experimentation was carried out to determine the optimum operating condition for this plant.



DIGESTER OPERATION

MONTH	SLUDGE TO DIGESTERS			SLUDGE FROM DIGESTERS			GAS PRODUCED 1000'S Cu. Ft.
	1000'S CU. FT.	% SOLIDS	% VOL. MAT	1000'S CU. FT.	% SOLIDS	% VOL. MAT	
JAN.	4.52	6.30	3.05	-	-	-	254.20
FEB.	6.97	5.50	3.10	-	-	-	168.13
MAR.	28.75	8.20	4.17	-	-	-	519.70
APR.	50.78	8.50	4.70	1.54	-	-	362.94
MAY.	29.53	8.76	4.17	4.62	9.77	4.87	426.46
JUNE.	47.06	6.60	3.43	1.57	9.40	3.76	890.88
JULY.	35.39	3.00	1.50	7.77	-	-	733.87
AUG.	36.35	-	-	-	9.30	5.90	* 159.62
SEPT.	105.79	3.39	1.93	22.43	11.22	4.08	** 263.00
OCT.	153.27	3.90	2.05	-	-	-	1015.04
NOV.	59.44	5.25	2.94	32.56	5.40	2.38	1096.96
DEC.	50.89	5.00	2.70	9.68	4.93	2.13	863.21
TOTAL	608.74	-	-	80.17	-	-	+ 7470.46
AVG.	50.73	5.85	3.07	6.68	8.34	3.85	622.54

* 14 days data

** 12 days data

+ Total prorated

COMMENTS

A total of 608,740 cubic feet of raw sludge was pumped to the digesters and a total of 80,170 cubic feet of digested sludge was removed. The digested sludge removed was equivalent to 112 cubic feet per million gallons of raw sewage.

No sludge was removed during the first months due to the initial filling of the digesters.

There was a decrease in the concentration of the raw sludge as the loading on the plant increased, and particularly during the canning season.

Most of the sludge was disposed of on the plant grounds. Digested sludge haulage was initiated in December.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	* 19.190	-	-
FEBRUARY	13.079	-	-
MARCH	49.273	-	-
APRIL	52.930	-	-
MAY	63.470	** 1250	8.72
JUNE	62.820	4190	6.67
JULY	67.710	5766	8.52
AUGUST	79.840	6994	8.76
SEPTEMBER	93.260	6135	6.58
OCTOBER	65.520	7225	11.03
NOVEMBER	72.420	8560	11.82
DECEMBER	77.570	4093	5.28
TOTAL	717.082	44213	-
AVERAGE	59.757	5527	8.29

* Prorated on available data

** 7 days' chlorination

COMMENTS

The final effluent was chlorinated from May until the end of the year. An average of 5527 pounds of chlorine gas was required each month at an average dosage of 8.29 ppm. The chlorine residual was maintained at 0.5 ppm for discharge to the Thames River.

CONCLUSIONS

The preceding data present the operating results for the first full year of operation at the Chatham plant. Many operating problems were uncovered, and many were solved.

The average flow was 1.965 million gallons. However, flows were over one half the design flow of 4.5 mgd by the end of the year. These flows do not represent storm flows, a high proportion of which are by-passed directly to the river.

Industrial wastes have created several problems at the project. Odours have been blamed on bean wastes, and some plating wastes of variable pH have killed the activated sludge on several occasions. The tomato pack was handled easily by the plant, although an aerated lagoon is being constructed for treatment of these wastes in the future.

RECOMMENDATIONS

It is recommended that industrial wastes by end of year is done, there will control plant, as well as control

ONTARIO WATER RESOURCES COMMISSION
DIVISION OF PLANT OPERATIONS.

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